



Optimization Models and Decision Support Tools for Staff Shift Planning in Hospital at Home Services

ENGINEERING AND MANAGEMENT

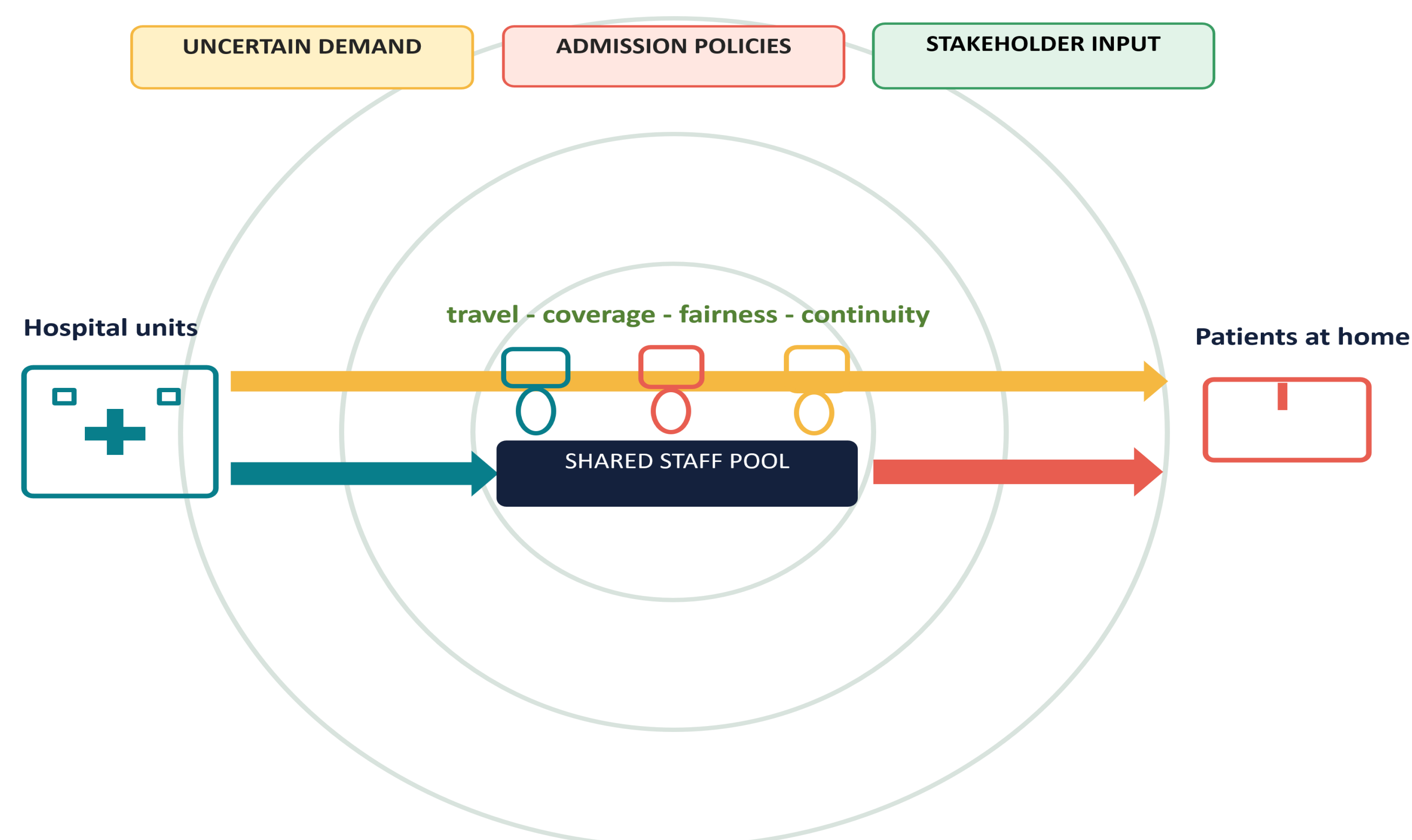
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INTRODUCTION

Hospital at Home (HaH) expands acute care beyond hospital walls, but staff must cover wards, homes, travel, and uncertainty at once. Optimization can turn this moving target into transparent staffing plans. [1-3]

OBJECTIVE

Develop stakeholder-informed optimization models and decision-support tools for tactical HaH shift planning with shared staff, uncertain demand, continuity of care, and fair workloads.



Optimizing the route between compassion and capacity!

Figure 1: Operationalities in HaH Services

ORIGINAL CONTRIBUTION AND EXPECTED RESULT

Stakeholder-informed novel optimization models tailored to the specific context of HaH and decision support tools that can be adapted to different HaH contexts and healthcare organizations.

WORK IN PROGRESS

1. Scoping review in progress.
2. Building instances for the Baseline MILP Model
3. In view: Including the sharing of staff, demand uncertainty, continuity of care, and fairness in the MILP model.

METHODOLOGY

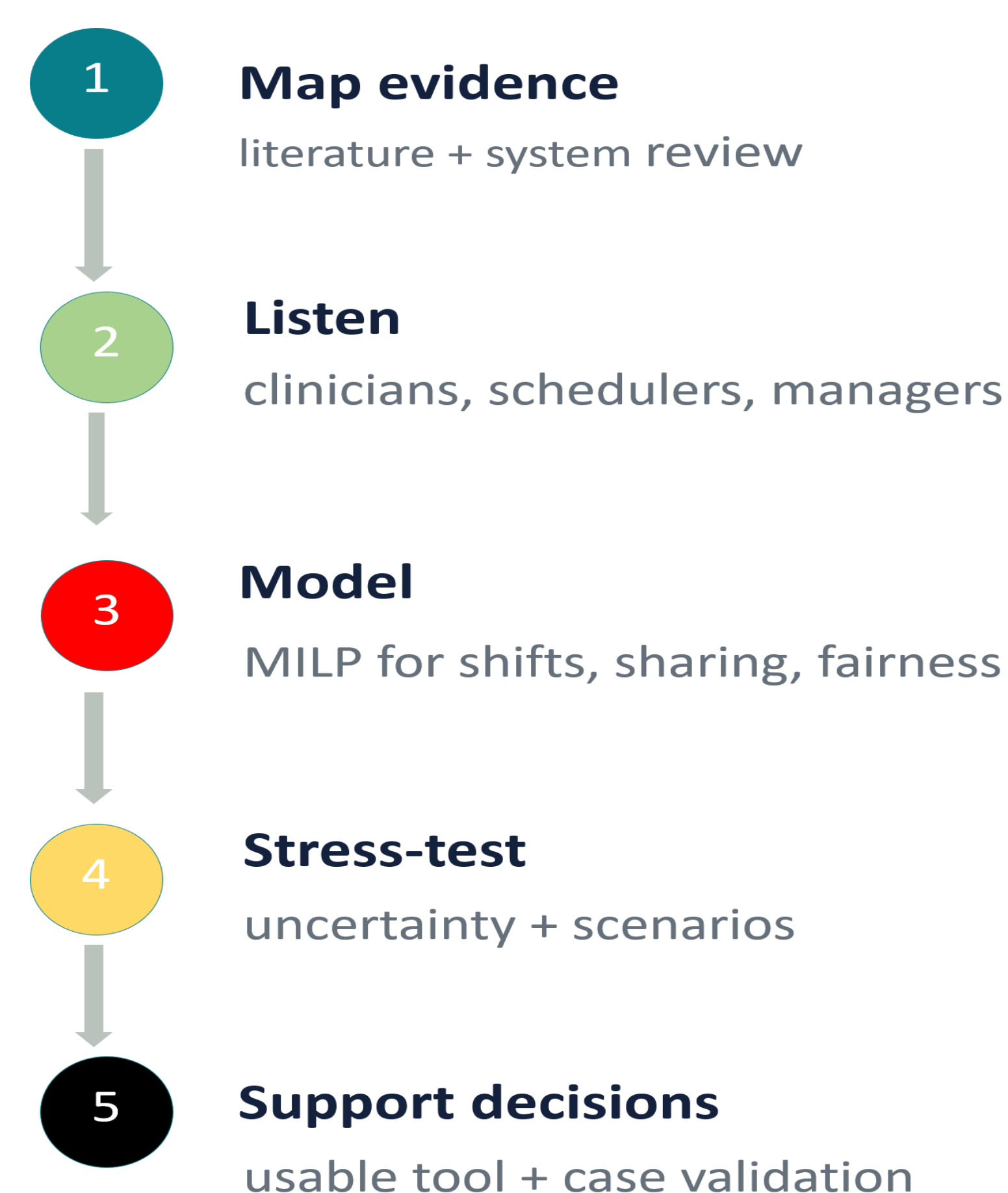


Figure 2: HaH Staff Scheduling Planning Methods

BASELINE MILP MODEL

The model constructs a staff schedule over a planning horizon; the objective function ensures sufficient coverage by minimizing under-coverage, preference violations, and other undesirable scheduling outcomes, while respecting staff availability and contractual working-hour requirements.

$$\min Z = w_U \sum_{d,s} u_{d,s} + w_O \sum_{d,s} o_{d,s} + w_{ON} \sum_{R^{on}} p_{nds}^{on} + w_{OFF} \sum_{R^{off}} p_{nds}^{off}$$

Where:

$$w_U \gg w_{ON}, w_{OFF} \gg w_O$$

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